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(54) Title of the invention: Network management
system

(57) Abstract:

Problem to be solved: To reduce the operation load of a
network manager.

Solution: The network management system is
constituted of a network management device 20 for
reducing the operation load of a network manager and
plural network equipments 10 to 12 having transmitted
destination address managing parts 10a to 12a for
managing transmitted destination addresses, expressing
the transmitted destinations of event informing signals
to manage the network. The device 20 transmits a
request signal Sig1, expressing the reduction of network
manager's operation load for specifying the setting of
transmitted destination addresses in the addresses of the

device 20 to plural network equipments 10 to 12, which respectively return response signals Sig2a to Sig2c which express the completion of operation for setting up the transmitted destination addresses in the addresses of the device 20.

[Claims]

[Claim 1] A network management device provided with a communications protocol for network management, the transmitted destination address managing part that manages a transmitted destination address showing a transmission destination of an event notification signal with which this network management device and communication are possible, and a purport of an event notification is expressed, the above network management system and the mentioned above network management device, a request signal showing specifying the mentioned above transmitted destination address that it sets as an address of the mentioned above network management device, transmitting to the mentioned above plurality of network equipment and the mentioned above plurality of network equipment, if the mentioned above request signal is received, the mentioned above transmitted destination address managed at the mentioned above transmitted destination address managing part, it is characterized by replying response signals showing having completed work that sets up as an address of the mentioned above network management device and sets the mentioned above transmitted destination address as an address of the mentioned above network management device at the mentioned above network management device.

[Claim 2] The mentioned above network management device, the mentioned above request signal that has the directions which change the mentioned above transmitted destination address for every transmission content of the mentioned above event notification signal, transmitting to the mentioned above plurality of network equipment and the mentioned above plurality of network equipment, the network management system according to claim 1 characterized by choosing the mentioned above network management device that should transmit the mentioned above event notification signal for every transmission content of the mentioned above event notification signal and transmits the mentioned above event notification signal.

[Claim 3] If the new addition of each of a plurality of the mentioned above network equipment is carried out to the mentioned above network, the network management system according to claim 1 to 2 characterized by transmitting an additional self-assessment signal showing transmitting the mentioned above request signal to the mentioned above all network management devices at least.

[Detailed description of the invention]

[0001]

[Field of the invention] This invention relates to the network management system that mainly manages a plurality of network equipment linked to a network using SNMP.

[0002]

[Description of the prior art] The conventional network management system is explained using drawing 4. Drawing 4 is an explanatory view of a network management system.

[0003] In order to perform network management of recording statistically the traffic volume on communication and generating of an obstacle phenomenon in a computer network conventionally, SNMP (Simple Network Management Protocol) that is a kind of a simple network management protocol is used widely.

[0004] In the network management system using SNMP, the phenomenon that should be notified to the network management device 20 which takes charge of network communication management to network equipment 10, 11, 12 linked to a network. When (it is next expressed as an event) occurs, the network equipment 10 connects the purport of an event generation by transmitting a trap packet to the network management device 20.

[0005] The network equipment 10 has the transmitted destination address managing part 10a, the network equipment 11 has the transmitted destination address managing part 11a, and the network equipment 12 has the transmitted destination address managing part 12a. The transmitted destination address managing part 10a, 11a, 12a manages the transmitted destination address with which the transmission destination of the event notification signal showing the purport of an event

notification is expressed, respectively. The network equipment 10, 11, 12 performs transmission of an event notification signal, namely, a trap packet, to addressing to IP (Internet Protocol) address of the addressing 20 to a transmitted destination address, namely, a network management device, respectively.

[0006] Such a network of network administrator needs to set the IP address of the network management device 20 as each of the transmitted destination address managing part 10a, 11a, 12a.

[0007]

[Problems to be solved by the invention] However, in the above conventional network management systems, as soon as a network administrator inputs the IP address of the network management device 20 from the keyboard of the network equipment 10, 11, 12, it is carried out, since the transmitted destination address managing part 10a, 11a, 12a needed to be alike, respectively and it was necessary to set up one by one, when the number of the network equipment 10, 11, 12 or the number of the network management device 20 increased, there was a problem that a network administrator's workload increased. A network administrator's work burden increases, thus a network administrator sets up the IP address of the network management device 20 accidentally, the network equipment 10, 11, 12 could not transmit a trap packet to the network management device 20, but there was a problem that network management could not be performed.

[0008] There is a place that was made in order that this invention might solve the above problems, and is made into the purpose in providing the network management system that can ease a network administrator's work burden.

[0009]

[Means for solving the problem] If it is in the invention according to claim 1, a network management device provided with a communications protocol for network management, this network management device and communication are possible, in a network management system about a network to constitute, with a plurality of network equipment that has the transmitted destination address managing part that manages a transmitted destination address showing a transmission destination of an event notification signal showing a purport of an event notification, the mentioned above network management device, a request signal showing specifying the mentioned above transmitted destination address that it sets as an address of the mentioned above network management device, transmitting to the mentioned above plurality of network equipment and the mentioned above plurality of network equipment, if the mentioned above request signal is received, the mentioned above transmitted destination address managed at the mentioned above transmitted destination address managing part, it is characterized by replying response signals showing having completed work that sets up as an address of the mentioned above network management device and sets the mentioned above transmitted destination address as an address of the

mentioned above network management device at the mentioned above network management device.

[0010] If it is in the invention according to claim 2, the network management system according to claim 1, and the mentioned above network management device, the mentioned above request signal which has the directions that change the mentioned above transmitted destination address for every transmission content of the mentioned above event notification signal, it transmits to the mentioned above plurality of network equipment, the mentioned above plurality of network equipment chooses the mentioned above network management device that should transmit the mentioned above event notification signal for every transmission content of the mentioned above event notification signal, and it is characterized by transmitting the mentioned above event notification signal.

[0011] If it is in the invention according to claim 3, the network management system according to claim 1 to 2, and each of a plurality of the mentioned above network equipment, if a new addition is carried out to the mentioned above network, it is characterized by transmitting an additional self-assessment signal showing transmitting the mentioned above request signal to the mentioned above all network management devices at least.

[0012]

[Embodiment of the invention] Next, the 1st embodiment based on drawing 1, the 2nd embodiment based on drawing 2 and the 3rd embodiment based on

drawing 3 of the network management system according to this invention are described in details.

[0013] [The 1st embodiment] Drawing 1 is an explanatory view of a network management system. The network equipment 10, 11, 12 and the network management device 20 have connected with a network, and the network management device 20 manages the communication state of the network equipment 10, 11, 12 to it, using SNMP as a network management protocol.

[0014] The network equipment 10 has the transmitted destination address managing part 10a, the network equipment 11 has the transmitted destination address managing part 11a, and the network equipment 12 has the transmitted destination address managing part 12a. The transmitted destination address managing part 10a, 11a, 12a manages the transmitted destination address with which the transmission destination of the event notification signal showing the purport of the notice of an event (phenomenon that should be notified to the network management device 20, such as requiring transmission for the second time) is expressed, respectively. That is, when an event occurs, the network equipment 10 connects the purport of an event generation by transmitting an event notification signal (for example, trap packet) to the network management device 20. In that case, the network equipment 10, 11, 12 transmits a trap packet to addressing to addressing to a transmitted destination address, namely, IP (Internet Protocol) address, of the network management device 20, respectively.

[0015] The network management device 20 will notify the network equipment 10, 11, 12 that it is a network management terminal in this network by simultaneous multiple address mode transmission as request packet Sig 1, if a power supply is periodically turned on, for example. Request packet Sig 1 includes specifying the transmitted destination address which the transmitted destination address managing part 10a, 11a, 12a manages, respectively that it sets as the IP address of the network management device 20.

[0016] The network equipment 10 will set up the transmitted destination address managed at the transmitted destination address managing part 10a as an IP address of the network management device 20, if request packet Sig 1 is received. If the work that sets a transmitted destination address as the IP address of the network management device 20 is completed, the network equipment 10, response signals Sig 2a showing having completed the work which sets a transmitted destination address as the IP address of the network management device 20 is transmitted to the network management device 20. In order to make the network management device 20 check the network equipment 10, that the transmitted destination address managed at the transmitted destination address managing part 10a is an IP address of the network management device 20 to be sure, the IP address of the network management device 20 is included in response signals Sig 2a and it transmits.

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The network management device 20 can recognize that received response signals Sig 2a and the network equipment 10 assigned its IP address to the transmitted destination address managing part 10a.

[0017] The network equipment 11 as well as the network equipment 10 will set up the transmitted destination address managed at the transmitted destination address managing part 11a as an IP address of the network management device 20, if request packet Sig 1 is received. If the work that sets a transmitted destination address as the IP address of the network management device 20 is completed, the network equipment 11, response signals Sig 2b showing having completed the work that sets a transmitted destination address as the IP address of the network management device 20 is transmitted to the network management device 20. In order to make the network management device 20 check the network equipment 11, that the transmitted destination address managed at the transmitted destination address managing part 11a is an IP address of the network management device 20 to be sure, the IP address of the network management device 20 is included in response signals Sig 2b, and it transmits. The network management device 20 can recognize that received response signals Sig 2b and the network equipment 11 assigned its IP address to the transmitted destination address managing part 11a.

[0018] The network equipment 12 as well as the network equipment 10, 11 will set up the transmitted destination address managed at the transmitted destination address managing part 12a as an IP address

of the network management device 20, if request packet Sig 1 is received. If the work that sets a transmitted destination address as the IP address of the network management device 20 is completed, the network equipment 12, response signals Sig 2c showing having completed the work that sets a transmitted destination address as the IP address of the network management device 20 is transmitted to the network management device 20. In order to make the network management device 20 check the network equipment 12, that the transmitted destination address managed at the transmitted destination address managing part 12a is an IP address of the network management device 20 to be sure, the IP address of the network management device 20 is included in response signals Sig 2c and it transmits. The network management device 20 can recognize that received response signals Sig 2c and the network equipment 12 assigned its IP address to the transmitted destination address managing part 12a.

[0019] Thus, if it is in the network management system of this invention, the network management device 20 request packet Sig 1 showing specifying a transmitted destination address that it sets it as the address of the network management device 20, transmitting to a plurality of network equipment 10, 11, 12, and a plurality of network equipment 10, 11, 12, when request packet Sig 1 is received, the transmitted destination address managing part 10a, the transmitted destination address managed by 11a, 12a, respectively is set up as an IP address of the network management device 20,

response signal Sig 2a which means having completed the work that sets a transmitted destination address as the IP address of the network management device 20 in the network management device 20, 2b, 2c having made it be what is replied, it becomes unnecessary to assign the IP address of the network management device 20 to each transmitted destination address managing part 10a, 11a, 12a of the network equipment 10, 11, 12 one by one, and a network administrator's work burden can be eased. Even if the number of the network equipment 10, 11, 12 increases, in order that the network management device 20 may distribute request packet Sig 1 automatically, without a network administrator setting up the IP address of the network management device 20 accidentally, the network equipment 10, 11, 12 cannot transmit a trap packet to the network management device 20, and performing network management becomes possible.

[0020] [The 2nd embodiment] Drawing 2 is an explanatory view of a network management system. The same numerals are given to the same part as the 1st the mentioned above embodiment and detailed explanation of the same part is omitted.

[0021] In order that the composition that serves as the feature unlike the network management system of the 1st embodiment of the mentioned above network management system of this 2nd embodiment may be explained simply, network equipment is represented in two totals and is the point that carried out the one-set new addition of the network management device further.

[0022] The network management device 20 transmits to the network equipment 10, 11 into request packet Sig 1a including the directions that change a transmitted destination address for every transmission content of an event notification signal. For example, the signal of the purport «will do by performing transmission to that effect to the network management device 20 if the amount of communication errors of each network equipment 10, 11 exceeds a threshold» is included in request packet Sig 1a.

[0023] When the network equipment 10 receives request packet Sig 1a, «a transmitted destination address when the amount of communication errors exceeds a threshold is an IP address of the network management device 20». It is recognized as a transmitted destination address when the amount of communication errors exceeds a threshold is stored to the transmitted destination address managing part 10a as an IP address of the network management device 20. The network equipment 10 transmits trap packet Sig 3a1 showing the amount of communication errors having exceeded the threshold to the network management device 20, when the amount of communication errors exceeds a threshold. That is, the network equipment 10 performs conditional trap packet transmission.

[0024] Also, when the network equipment 11 receives request packet Sig 1a, a transmitted destination address when the amount of «communication errors exceeds a threshold is an IP address of the network management device 20».

It is recognized as a transmitted destination address when the amount of communication errors exceeds a threshold is stored to the transmitted destination address managing part 11a as an IP address of the network management device 20. The network equipment 11 transmits trap packet Sig 3b1 showing the amount of communication errors having exceeded the threshold to the network management device 20, when the amount of communication errors exceeds a threshold. That is, the network equipment 11 performs conditional trap packet transmission too.

[0025] The network management device 20, the network management device 21 performs communication management of the network equipment 10, 11, independently. The network management device 21 transmits to the network equipment 10, 11 into request packet Sig 1b including the directions that change a transmitted destination address for every transmission content of an event notification signal. For example, the signal of the purport «will do by performing transmission to that effect to the network management device 21 if the load on operation of CPU for communication of each network equipment 10, 11 exceeds a fixed threshold» is included in request packet Sig 1b.

[0026] When the network equipment 10 receives request packet Sig 1b, a transmitted destination address when the load on operation of CPU for «communication exceeds a fixed threshold is an IP address of the network management device 21».

It is recognized as a transmitted destination address when the load on operation of CPU for communication exceeds a fixed threshold is stored to the transmitted destination address managing part 10a as an IP address of the network management device 21. The network equipment 10 transmits trap packet Sig 3a2 showing the load on operation of CPU for communication having exceeded the fixed threshold to the network management device 21, when the load on operation of CPU for communication exceeds a fixed threshold. That is, the network equipment 10 performs trap packet transmission conditional different from the conditions corresponding to the network management device 20.

[0027] Also, when the network equipment 11 receives request packet Sig 1b, a transmitted destination address when the load on operation of CPU for «communication exceeds a fixed threshold is an IP address of the network management device 21». It is recognized as a transmitted destination address when the load on operation of CPU for communication exceeds a fixed threshold is stored to the transmitted destination address managing part 11a as an IP address of the network management device 21. The network equipment 11 transmits trap packet Sig 3b2 showing the load on operation of CPU for communication having exceeded the fixed threshold to the network management device 21, when the load on operation of CPU for communication exceeds a fixed threshold. That is, the network equipment 11 performs trap p acket transmission conditional different from the conditions corresponding to the network management device 20.

[0028] Thus, in the effect of the mentioned above 1st embodiment in addition, the network management devices 20, 21, request packet Sig 1a which has the directions that change a transmitted destination address for every transmission content of a trap packet, transmit to a plurality of network equipment 10, 11, and Sig 1b a plurality of network equipment 10, 11, a trap packet having chosen the network management devices 20, 21 that should transmit a trap packet for every transmission content of a trap packet, and having made it be what transmits, even if a trap packet will be transmitted according to a kind, it is easy to perform arrangement of a trap packet to each of the network management devices 20, 21 for every network management device 20, 21 and communication problems occur, it becomes easy to cancel communication problems.

[0029] [The 3rd embodiment] Drawing 3 is an explanatory view of a network management system. The same numerals are given to the same part as the 1st the mentioned above embodiment and detailed explanation of the same part is omitted.

[0030] The composition from which the network management system of this 3rd embodiment serves as the feature unlike the network management system of the 1st the mentioned above embodiment is the point that made new addition connection of the network equipment 13 other than the network equipment 10, 11, 12.

[0031] The network equipment 13 has the transmitted destination address managing part 13a like the network equipment 10, 11, 12. If it is connected to a network and the network equipment 13 is put into a power supply, additional self-assessment signal Sig4 showing wanting to transmit request packet Sig 1 is transmitted towards all the network apparatus, such as the network management device 20 and the network equipment 10, 11, 12. Always it was connected to the network, and since the network equipment 13 does not recognize the IP address of the network management device 20, it is not understood which apparatus is the network management device 20. For this reason, the network equipment 13 turns and transmits additional self-assessment signal Sig 4 to all the network apparatus.

[0032] The network management device 20 will transmit request packet Sig 1, Sig 1a or Sig 1b to the whole network like the 1st embodiment or the 2nd embodiment mentioned above, if additional self-assessment signal Sig 4 is received.

[0033] Thus, in the effect of the mentioned above 1st embodiment in addition, the network equipment 13, if a new addition is carried out to a network, additional self-assessment signal Sig 4 showing transmitting request packet Sig 1, Sig 1a or Sig 1b, since it constituted so that it might be what transmits to the network management devices 20 and a plurality of network equipment 10, 11, 12, the network management device 20, new connection of the network equipment 13 can be discovered, it is on communication, the network equipment 13 can be managed now, and the load of

setting out of the network administrator at the time of connecting the network equipment 13 to a network can be decreased.

[0034] In the mentioned above embodiment, although there was the one network management device 20, as for this invention, it may connect a plurality of network management devices not only like this, but like the above 2nd example.

[0035] In the mentioned above embodiment, although the function that transmits additional self-assessment signal Sig 4 showed the example as if it was carried only in the network equipment 13, the function in which this invention transmits not only this, but an additional self-assessment signal may be carried in any of a plurality of network equipment.

[0036]

[Effect of the invention] If it is in the invention according to claim 1, a network management device, if the request signal showing specifying a transmitted destination address that it sets as the address of a network management device is transmitted to a plurality of network equipment and a plurality of network equipment receives a request signal, the transmitted destination address managed at the transmitted destination address managing part is set up as an address of a network management device, the response signals which mean having completed the work that sets a transmitted destination address as the address of a network management device in a network management device having made it be what is replied, it becomes

unnecessary to assign the address of a network management device to each transmitted destination address managing part of network equipment one by one, and a network administrator's work burden can be eased. Even if the number of network equipment increases, in order that a network management device may distribute a request signal automatically, without a network administrator setting up the address of a network management device accidentally, network equipment cannot transmit an event notification signal to a network management device, and performing network management becomes possible.

[0037] If it is in the invention according to claim 2, to the effect of the invention according to claim 1 in addition, a network management device, transmit to a plurality of network equipment, and the request signal that has the directions that change a transmitted destination address for every transmission content of an event notification signal a plurality of network equipment, an event notification signal having chosen the network management device that should transmit an event notification signal for every transmission content of an event notification signal, and having made it be what transmits, even if an event notification signal will be transmitted according to a kind, it is easy to perform arrangement of an event notification signal in each of a network management device for every network management device and communication problems occur, it becomes easy to cancel communication problems.

[0038] If it is in the invention according to claim 3, to the effect of the invention according to claim 1 to 2 in addition, each of a plurality of network equipment, at least the additional self-assessment signal showing transmitting a request signal having made it be what transmits to all the network management devices, when the new addition was carried out to the network, the network management device can discover new connection of network equipment, is on communication, can manage network equipment now and can decrease the burden of setting out of the network administrator at the time of connecting network equipment to a network.

[Brief description of the drawings]

[Drawing 1] is an explanatory view of the network management system of the 1st embodiment according to this invention.

[Drawing 2] is an explanatory view of the network management system of the 2nd embodiment according to this invention.

[Drawing 3] is an explanatory view of the network management system of the 3rd embodiment according to this invention.

[Drawing 4] is an explanatory view of the conventional network management system.

[Description of numerals]

10, 11, 12 Network equipment

10a, 11a, 12a Transmitted destination address managing part
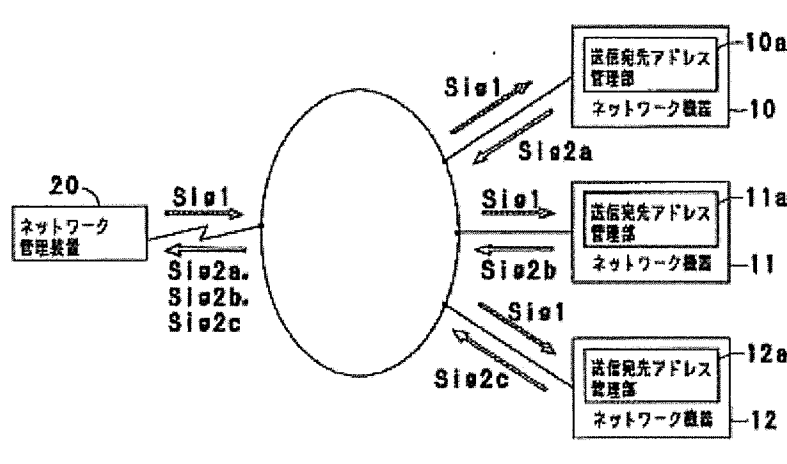
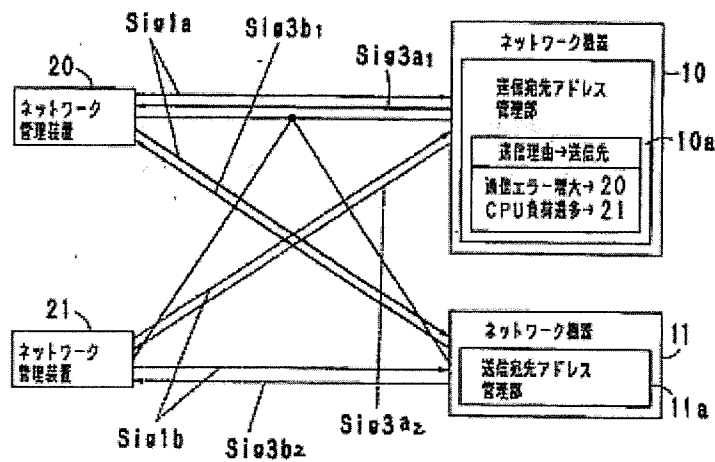20, 21 Network management device

Sig 1, 1a, 1b Request signal

Sig 2a, 2b, 2c Response signals
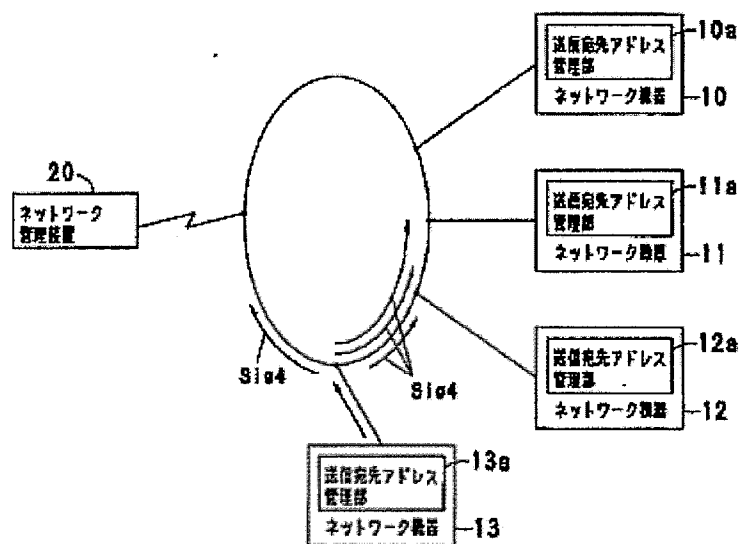
Sig 4 Additional self-assessment signal

Drawing 1

Drawing 2

Drawing 3

Drawing 4